

## ***Interactive comment on “Marine bivalve geochemistry and shell ultrastructure from modern low pH environments” by S. Hahn et al.***

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Dear anonymous colleague,

Thank you very much for the time and efforts you invested in the review of our ms. We certainly appreciate this! We are pleased to see that you find the paper both novel and significant. Regarding language, we will improve the Swiss grammar.

You emphasize two main points;

(i) You ask if we sampled and analyzed water from the harbour of Ischia.

We did not sample the water, this was done by friends from Naples and we analyzed these samples at Bochum. The results are very similar to those reported in Pierre

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(1999). We will need to make it clear that these measurements were so similar and that we have data from the harbour.

(ii) The second issue refers to the admixture of calcite and aragonite and the expected differences in carbon and oxygen isotope signatures.

We agree that the values must be normalized and will do so in the revised version. We politely disagree with the statement that data comprising sampling powder with unspecified proportions of both calcite and aragonite should be deleted from the ms. This is because we performed this study to explore the potential of fossil shell material (e.g. across the PETM) as an archive of past ocean acidification. If present, aragonitic shell material in many fossil carbonate archives will be altered, partly or entirely. A carbonate geochemist or oceanographer might conclude that you cannot use this material. However, geologists use such material as archives and study diagenesis to separate signal from noise (e.g. paleoceanographic work on micrite). Much of this micrite might have been aragonite to start with and is now diagenetically altered to calcite. In addition, some of these shells are so thin, that extracting enough sample powder (micro drill) for analytical work from either the aragonite or the calcite portions of the shells is not feasible except perhaps with a laser. We had no access to analytical instrumentation that would allow us to perform these analyses with the spatial resolution.

We intend to show to the reader what the aragonite data show, what the calcite data show and what the bulk sample shows. We will emphasize the potential and pitfalls of this approach more clearly in our revised ms.

Many of the other comments are more minor in nature, clearly useful and will be accommodated. Where changes are not possible due to limitation in analytical infrastructure or field time we will explain these points in the revision note.

Thank you once more for your valuable advice.

Adrian Immenhauser

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